

**Investing in Innovation & Infrastructure** 

# Highlights

Advisory Committees' Draft - March 26, 2014

## The California Water Plan's Role ► Inform Action

Consistent with State law, California Water Plan Update 2013 (Update 2013) lays out recommendations rather than mandates. Based on decades of scientific data and analyses, nearly 40 State agency plans, and the voices of hundreds of stakeholders, Update 2013 is a tool to guide investment priorities and legislative action and ensure resilient and sustainable water resources moving forward. Update 2013 applies at statewide, regional, and local scales, and serves to advise a diverse audience, including elected officials, planners and resource managers, tribal governments and communities, academia, and the general public.

#### Navigating Water Plan Update 2013

Update 2013 provides a wide range of information, from a detailed description of California's current and potential future conditions to a "Roadmap For Action" intended to achieve desired benefits and outcomes. The plan is organized in five volumes. Volumes 1, 2, and 3 are outlined below. Volume 4, Reference Guide and Volume 5, Technical Guide, will be released in spring 2014.



#### **VOLUME 1, The Strategic Plan**

- Call to action, new features for Update 2013, progress toward implementation.
- Update 2013 themes.
- Comprehensive picture of current water, flood, and environmental conditions.
- Strengthening government alignment and water governance.
- Planning (data, analysis, and public outreach) in the face of uncertainty.
- Framework for financing the California Water Plan.
- Roadmap for Action Vision, mission, goals, principles, objectives and actions.



#### **VOLUME 2, Regional Reports**

- State of the region watersheds, groundwater aquifers, ecosystems floods, climate, demographics, land use, water supplies and uses, governance.
- Current relationships with other regions and states.
- Accomplishments and challenges.
- Looking to the future future water demands, resource management strategies, climate change adaptation.



#### **VOLUME 3, Resource Management Strategies**

Integrated Water Management Toolbox, 30+ management strategies to:

- Reduce water demand.
- Increase water supply.
- Improve water quality.
- Practice resource stewardship.
- Improve flood management.
- People and water. Advisory Committees' Draft March 26, 2014

## Secretary's Message

# The California Water Plan > Advancing Integrated Water Management

For almost 60 years, the California Water Plan (CWP) has served as the long-term strategic plan for informing and guiding the sound management and development of water resources in the state. With updates every five years, it remains the single most complete and relevant body of knowledge about statewide water resources. Update 2013 reaffirms the State's commitment to integrated water management (IWM). It recognizes and reflects these five things every Californian should know:

#### Water is the Essence of Life for California.

Every living thing in the state, as well as our economy, depends on reliable, clean water to thrive. There are greater demands for water in our state than ever before.

#### California's Complex Water System is in Crisis.

Our interconnected system of water resources — natural and human made — is severely threatened on many fronts, with significant risks to our health, safety, and economic well-being.

#### A Diverse Portfolio Approach is Required.

The complexity of our water resources systems and the associated risks demand a diverse set of actions and investment strategies. There is no silver bullet.

#### **Solutions Require Integration, Alignment, and Investment.**

Commitment to the IWM approach, alignment toward a common vision, and stable financing are essential to ensuring future resiliency.

#### We All Have a Role to Play in Securing Our Future.

Decision-makers, resource agencies, water resource managers, and interest groups at the State, federal, tribal, and local levels need to actively engage in the solutions.

## California Water Plan Role California Water Action Plan Strategy and Data Assessment Action Recommendations

#### What is IWM?

IWM is a holistic and cooperative approach to developing and managing water resources, which seeks to identify and achieve workable tradeoffs between different economic, social, and environmental objectives. It applies a strategic approach to planning and implementing water management programs that combines flood management, ecosystem enhancement, and water supply actions to deliver multiple benefits across watershed and jurisdictional boundaries.

#### Moving From Planning to Action

Update 2013 is also a resource for implementing the governor's Water Action Plan in a manner aligned with the State's long-term, strategic vision for water. The plan describes 10 essential actions that represent the Brown Administration's priorities for the next five years (represented under "Investment Priorities" in the figure below). The plan was informed by the more comprehensive suite of recommended actions in Update 2013.

#### How will we know when we are successful?

When more sustainable outcomes and enhanced water supply reliability are occurring, as defined by improved public safety, enhanced environmental stewardship, and economic stability, we will have achieved success. In order to help determine if IWM actions are effective, Update 2013 advanced a framework for a systematic approach for measuring progress towards desired outcomes. Update 2013 demonstrated that the framework, with web-based decision support, could be an effective tool in tracking and evaluating progress towards resource sustainability.



See the index linking the 10 essential actions to the content of Update 2013 here: ????



PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY



## *Water* ► ► The Essence of Life for California

#### **Public Safety**

- Reduce flood risk statewide.
- Improve water quality for fisheries and recreation.
- Provide safe drinking water.
- Ensure clean, safe water supplies.

#### **Environmental Stewardship**

- Enhance Bay-Delta ecosystem.
- Restore terrestrial and aquatic habitats.
- Improve watershed management.
- Raise awareness and increase stewardship.

#### **Economic Stability**

- Enhance the state's economic output.
- Contribute to job creation and security.
- Promote food production security.
- Provide stable funding for infrastructure.

Update 2013 lays out a comprehensive suite of future actions intended to move California toward more sustainable management of water resources and more resilient water management systems. Ultimately, sustainability and resiliency need to be measured in terms of improved public safety (societal benefits), environmental stewardship (environmental benefits), and economic stability (financial benefits). All Californians depend on water for their well-being — including the myriad ways water supports California's \$2 trillion economy.













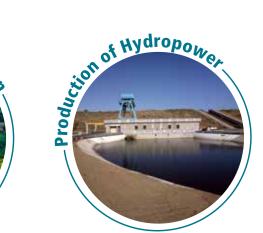
















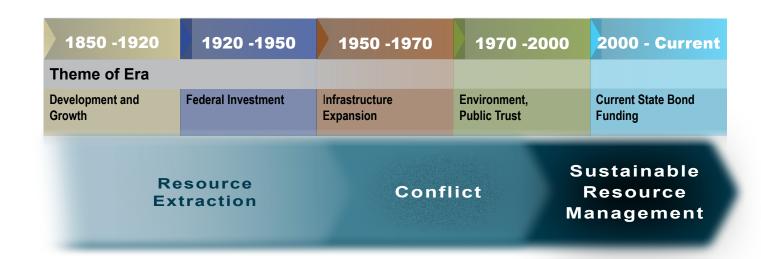
#### How Our Past Shaped the 21st Century

#### **The Past**

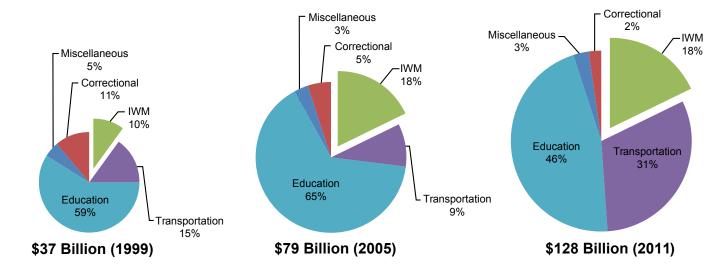
California invested in water and flood management infrastructure to promote growth and economic development in rural, suburban, and urban communities. This involved a period of resource extraction that led to a booming economy with benefits still enjoyed today, while at the same time extraction created a number of unintended consequences and resource conflicts.

#### **21st Century**

California is managing conflicts over resources and planning for more sustainable resource management. State government supports interregional projects, provides environmental protection and enhancement, promotes multibenefit IWM programs and projects with more sustainable outcomes, and ensures that disadvantaged communities have safe water and sanitation.



Volume 1, Chapter 3; California Water Today



#### **Emerging Impacts of Funding Limitations**

Insufficient State and federal investment and action over the past 20 years have made us far too reliant on outdated infrastructure and innovations that are no longer capable of meeting our growing needs. At the same time, per capita State debt rose nearly 300 percent over the last 10 years. This, in addition to the economic downturn, has significantly reduced the taxpayers' and ratepayers' willingness and ability to pay for new improvements.

In 1999, every Californian (per capita) was responsible for about \$1,100 in General Obligation (GO) bond debt; currently (2011), every Californian is responsible for over \$3,400 dollars in GO bond debt.

Volume 1, Chapter 7; Finance Planning Framework

# A System in Crisis > Our Challenges Are Growing



### Current trends show reduced prosperity for future generations

#### **Greater Drought Impacts — Unreliable Water Supplies**

The well-being of all Californians has depended on the reliable storage and movement of large quantities of water throughout the state. It is now becoming increasingly difficult to move water great distances due to declining ecosystems (and related regulatory requirements), rising energy costs, and aging infrastructure. This is wholly apparent in the Sacramento-San Joaquin Delta (Delta). At the same time, the state's environment and economy are becoming increasingly susceptible to the affects of reduced water supply reliability.

#### **Changing Water Demands**

California's changing and potentially competing demands for water come from many sectors. All uses generally can be characterized as urban, agricultural, or environmental. The state's population continues to grow, and the trend has been toward faster growth in warmer inland regions. From 1990 to 2010, California's population increased from about 30 million to about 37.3 million. The California Department of Finance projects that this trend indicates a state population of roughly 51 million by 2050.



Every Californian is exposed to the significant impacts that result from flooding, including disruption of commerce, response, and the secondary economic impacts that ripple through the state's economy (e.g., redirection of funding from other State government services).

#### **Millions Are Affected by Groundwater Supplies**

- Thirty million Californians rely on groundwater for a portion of their drinking water
- Many water users in the Central valley, particularly the San Joaquin valley and Tulare Lake areas are turning to groundwater as surface supplies are becoming less reliable, particularly surface supplies delivered through the Delta.
- Up to 13 million acre-feet of groundwater storage were depleted in these areas between 2005 and 2010, enough water to meet all urban demands in California for one year.
- Several groundwater basins throughout California are contaminated with human-made or naturally occurring pollutants.
- Land elevations are dropping as fast as 1 foot per year in some localities.

#### **Degrading Environmental Conditions and Water Quality**

California has experienced decades of unacceptable habitat and species declines. The sustainability of habitats and the species they support are highly vulnerable to climate change, water quality degradation, land use decisions, and many other drivers related to IWM.

#### **Degraded Surface and Groundwater Quality**

The quality of groundwater and surface waters varies significantly throughout the state. Degradation has occurred and is continuing to occur in many locations naturally and as a result of human activities.

#### **Aging Infrastructure**

California's water supply and flood protection systems, composed of aging infrastructure that has been further weakened by insufficient maintenance in some areas. State and federal governments have no implemented new large-scale infrastructure in decades.

#### **Physical Variability and Social Diversity**

California is often recognized as a land of extremes for its diversity of cultures, ecosystems, geography, and water resources. At the same time, California's various cultures, organizations, and individuals naturally assign different values and priorities to these IWMrelated assets, services and benefits. The water and flood systems face the dual threats of too little water to meet needs during droughts and too much water during floods. The physical and social realities within California do not allow for a one-size-fits-all approach to water management and planning. This can also make it difficult to build cohesive support for a particular direction or action across diverse stakeholders.

#### **Unsustainable and Inadequate Funding**

Insufficient funding and budget limitations, in recent years, have further reduced the ability of the State to meet its critical roles. Critical roles of State government that have tended to be underfunded include (1) planning and developing principles for State investments at regional (State cost-sharing/incentives) and statewide scales, (2) performance tracking to help ensure a return on Californian's hard-earned and limited money, (3) ensuring safe water for all Californians, and (4) implementing and managing statewide systems.









## A Call to Action

#### Roadmap for Implementing Integrated Water Management



Management

**Strategies** 

Update 2013 provides a vision for more sustainable and reliable water resources and management systems. Mission statements describe collaborative efforts to prepare for California's most pressing statewide and regional water management issues and challenges.

Seven goals set forth the desired outcomes of the CWP.

Ten guiding principles express the core values and philosophies for how the vision, mission, and goals will be achieved.

Seventeen objectives and their 350-plus related actions are geared toward fulfilling the vision, mission, goals, and principles.

Over30 resource management strategies are described as tools for diversifying water portfolios and implementing IWM.

Volume 1, Chapter 8; Roadmap For Action



## Charting a Resilient Future

Update 2013 has significantly advanced the State's strategic plan by recommending actions in three critical areas:

- Enhance regional and statewide IWM
- Strengthen government agency alignment
- Invest in innovation and infrastructure

IWM provides a set of principles and practices that include strengthening government agency alignment through an open and transparent planning process. This leads to stakeholder and decision-maker support for investment in various aspects of resource management, such as innovation and infrastructure. Ultimately, IWM can expedite implementation through increased advocacy, as well as a greater number and variety of potential implementers and financiers. IWM and integrated regional water management (IRWM) practices have made strides over the past 10 years, and Update 2013 encourages continuation and expansion of these practices. Fostering broader implementation of IWM is intended to improve or restore expected levels of service within flood and water management systems statewide, while also improving system resiliency (the ability of systems to respond to and recover from significant stressors). IWM program delivery will be conducted using measurable objectives that provide for accountability of public investment and transparency on the value that society will attain from investing in IWM initiatives.

#### **Integrated Water Management**

System flexibility and resiliency Advocacy from implementers and financiers Delivery of benefits using fewer resources

#### **Government Agency Alignment**

Clarification of state roles Reduction in implementation time and costs Efficient achievement of multiple objectives

#### **Investment in Innovation and Infrastructure**

Stable and strategic funding Priority-driven funding decisions Equitable and innovative finance strategies

Volume 1, Chapter 2; Imperative to Invest In Innovation and Infrastructure



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# California Vision 2050 >> Roadmap for Action

Update 2013 sets us on a strategic path to managing our water resources in a way that provides reliable and clean water supplies for all beneficial uses today and for generations.



#### **Vision**

California has healthy, resilient watersheds and reliable and secure water resources and management systems. Public health, safety, and quality of life in rural, suburban, and urban communities are significantly improved as a result of advancements in IWM. The water system provides the certainty needed for quality of life, sustainable economic growth, business vitality, and agricultural productivity. California's unique biological diversity, ecological values, and cultural heritage are protected and have substantially recovered.

#### Goals

- 1. California's water supplies are adequate, reliable, secure, affordable, sustainable, and of suitable quality for beneficial uses, such as protecting, preserving, and enhancing watersheds, communities, cultural resources and practices, environmental and agricultural resources, and recreation.
- 2. State government supports integrated water resources planning and management through leadership, assistance, oversight, and public funding.
- 3. Regional and interregional partnerships play a pivotal role in California water resources planning, water management for sustainable water use and resources, and increasing regional self-reliance.
- 4. Water resource and land use planners make informed and collaborative decisions and implement integrated actions to increase water supply reliability, use water more efficiently, protect water quality, improve flood protection, promote environmental stewardship, and ensure environmental justice and public access to water bodies, in light of drivers of change and catastrophic events.
- 5. California is prepared for climate uncertainty by developing adaptation strategies and investing in a diverse set of actions that reduce the risk and consequences posed by climate change, as well as make the system more resilient to change and increase the sustainability of water and flood management systems and the ecosystems they depend on.
- 6. Integrated flood management, as a part of IWM, increases flood protection, improves preparedness and emergency response, enhances floodplain ecosystems, and promotes sustainable flood management systems.
- 7. The benefits and consequences of water decisions and access to State government resources are equitable across all communities.



#### Mission

Updating the CWP provides federal, State, tribal, regional, and local governments and organizations with a continuous planning forum to collaboratively:

- Recommend strategic goals, objectives, and near-term and long-term actions that would conserve, manage, develop, and sustain California's watersheds, water resources, and management systems.
- Prepare response plans for floods, droughts, and catastrophic events that would threaten water resources and management systems, the environment, and property, as well as the health, welfare, and livelihood of the people of California.
- Evaluate current and future watershed and water conditions, challenges, and opportunities.



#### **Guiding Principles**



- 1. Manage California's water resources and management systems with ecosystem health and water supply and quality reliability as equal goals, with full consideration of public trust uses.
- 2. Use a broad, stakeholder-based, long-view perspective for water management.
- 3. Promote sustainable resource management on a watershed basis.
- Increase system flexibility and resiliency.
- Increase regional self-reliance.
- 6. Determine values for economic, environmental, and social benefits; costs; and tradeoffs so as to base investment decisions on sustainability indicators.
- 7. Incorporate future variability, uncertainties, and risk in the decision-making process.
- 8. Apply California's water rights laws, including the longstanding constitutional principles of reasonable use and public trust, as the foundation for public policy-making, planning, and management decisions on California water resources.
- 9. Promote environmental justice the fair treatment of people of all races, cultures, and incomes.
- 10. Use science, best data, and local and traditional ecological knowledge in a transparent and documented process.



Update 2013's **17 objectives** will help achieve the CWP goals. Meeting these objectives, and planning and investing in their 350-plus related actions, will help California deal with a changing climate and other uncertainties and risks, and provide more adaptive and resilient ecosystems and more sustainable water and flood systems.

#### 1. Strengthen Integrated Regional Water Management

Strengthen IRWM planning and implementation to maintain and enhance regional water management partnerships and improve regional self-reliance.

#### 2. Use and Reuse Water More Efficiently

Use water more efficiently with significantly greater water conservation, recycling, and reuse to help meet future water demands and adapt to climate change.

#### 3. Expand Conjunctive Management of Multiple Supplies

Advance and expand conjunctive management of multiple water supply sources with existing and new surface and groundwater storage to prepare for future droughts, floods, and climate change.

#### 4. Protect and Restore Surface Water and Groundwater Quality

Protect and restore surface water and groundwater quality to safeguard public and environmental health and secure California's water supplies for beneficial uses.

#### 5. Practice Environmental Stewardship

Practice, promote, improve, and expand environmental stewardship to protect biological diversity and sustain natural water and flood management systems in watersheds, on floodplains, and in aquatic habitats.

#### 6. Improve Flood Management Using an Integrated Water Management Approach

Promote and practice flood management that reduces flood risk to people and property and maintains and enhances natural floodplain functions using an IWM approach. An IWM approach utilizes a systemwide perspective and considers all aspects of water management, including public safety and emergency management, environmental sustainability, and economic stability (which includes water supply reliability, water quality, and system and community resiliency).

#### 7. Manage the Delta to Achieve the Coequal Goals for California

Manage the Delta as both a critically important hub of the California water system and as California's most valuable estuary and wetland ecosystem. Achieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

#### 8. Prepare Prevention, Response, and Recovery Plans

Prepare prevention, response, and recovery plans for floods, droughts, and catastrophic events to help residents and communities, particularly disadvantaged communities, make decisions that reduce the consequences and recovery time of these events when they occur.

Numbering of elements in this strategic plan is for ease of reference and does not represent priority. Find details of the Water Plan's objectives and related actions in Volume 1 Chapter 7 Implementation Plan.

#### 9. Reduce the Carbon Footprint of Water Systems and Water Uses

Maximize the efficient use of California's surface and ground water supplies through integrated policies and strategies that reduce the carbon footprint of water while meeting the needs of a growing population, improving public safety, fostering environmental stewardship, and supporting a stable state economy.

#### 10. Improve Data, Analysis, and Decision-Support Tools

Improve and expand data management, analysis, and decision-support tools to advance IWM, given demographic, land use, climate, environmental, and institutional uncertainties.

#### 11. Invest in Water Technology and Science

Identify, develop, and prioritize research needs for new technologies; advance development and implementation of existing and emerging tools, technologies and innovations; and encourage partnerships in water-related technology and science to promote more efficient, effective, and sustainable water resources management and a better scientific understanding of California's water-related systems.

#### 12. Improve Tribal/State Relations and Natural Resources Management

Develop relationships with California Native American Tribes that acknowledges and respects their inherent rights to exercise sovereign authority and ensure that they are incorporated into planning and water resources decision-making processes in a manner that is consistent with their sovereign status.

#### 13. Ensure Equitable Distribution of Benefits

Increase the voice of small and disadvantaged communities in State processes and programs to achieve fair and equitable distribution of benefits. Provide access to safe drinking water and wastewater treatment for all California communities, and ensure programs and policies address the most critical public health threats in disadvantaged communities.

#### 14. Protect and Enhance Public Access to the State's Waterways, Lakes, and Beaches

Protect and enhance public access to the state's waterways, lakes, and beaches for cultural, recreational, and economic purposes consistent with maintaining healthy ecosystems.

#### 15. Strengthen Alignment of Land Use Planning and Integrated Water Management

Strengthen the alignment of goals, policies, and programs for improving local land-use planning and IWM.

#### 16. Strengthen Alignment of Government Processes and Tools

Improve, align, and transform processes and administrative tools (incentives and oversight) — at all levels of government — used for water planning, public engagement, program/project implementation, and policy- and regulation-setting to advance IWM.

#### 17. Improve Integrated Water Management Finance Strategy and Investments

State government uses consistent, reliable, and diverse funding mechanisms with an array of revenue sources to support statewide and regional IWM activities. State government also makes future investments in innovation and infrastructure (green and grey) based on an adaptive and regionally appropriate prioritization process.

# Three Themes of Update 2013 >> A Call To Integrate



#### Why Should Water Management be Better Integrated?

#### **Integrated Water Management Delivers VALUE**

With Update 2013, the State is renewing its commitment to IWM. After promoting and applying IWM at the regional level over the last decade, stakeholders can now point to results that show value for continued public investment via the following actions:

- Maximize limited resources to provide for increased public well-being.
- Broaden support for projects, to thereby reducing the changes of be delayed or stopped.
- Improve or restore expected levels of service within flood and water management systems statewide.
- Improve system resiliency to respond to and recover from significant stressors.
- Use measurable indicators about return on investments.

#### Proven Results — Providing a Return on Public Investment

#### **Improved system flexibility and resiliency** to respond to and recover from significant stressors

The Folsom Dam Auxiliary Spillway Project is a \$900-million cooperative involving the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, Sacramento Area Flood Control Agency, and Central Valley Flood Protection Board, which will help the Sacramento region achieve 200-year level of protection. By combining their efforts into a single project, the agencies will complete the project faster and at a lower cost.

#### **Broader support and increased advocacy** for multi-beneficiary projects from potential implementers and financiers

Santa Rosa Urban Reuse Pilot Project leverages State funding to construct pipelines, pump stations, and filtration. Project benefits include improved water supply reliability, reduced conflicts, enhanced salmonid habitat as a result of reduced diversions from the Russian River, and water quality improvements resulting from reduced recycled water discharges to the Laguna de Santa Rosa and the Russian River.

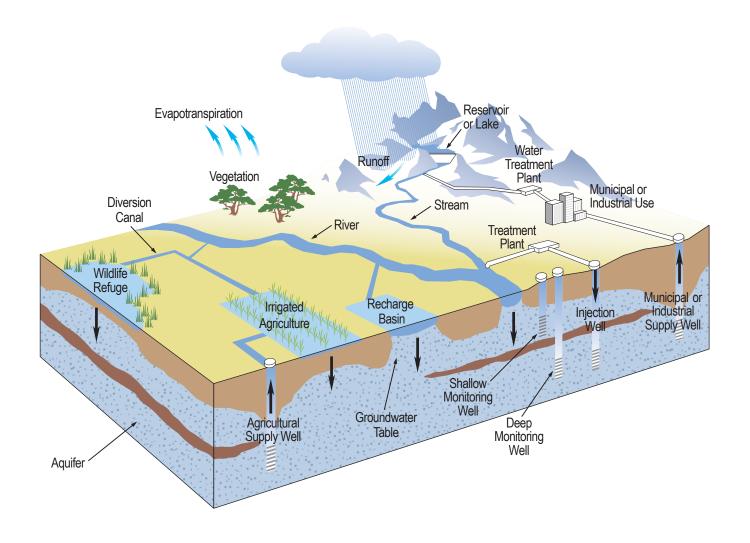
#### **Delivery of multiple benefits at a faster pace** using fewer resources than are typically required to implement single-benefit projects

The Santa Margarita Conjunctive Use Project provides for enhanced recharge of the groundwater basin beneath the Marine Corps Base Camp Pendleton in northern San Diego County. It also includes a seawater intrusion barrier that uses recycled water, a distribution system, and advanced water treatment facilities. This project will provide a new water supply of about 6,800 acre-feet per year for Camp Pendleton and Fallbrook Public Utilities District, and will resolve a long-standing water rights dispute between Fallbrook and the federal government.

#### How Should Water Management be Better Integrated?

#### **Interconnected Systems Require Integrated Solutions**

Besides asserting the State's continuing commitment to IWM, Update 2013 takes the critical next step in tangibly advancing IWM. This includes developing the scope, definitions, and desired outcomes that can guide development of integrated state and regional plans in a meaningful and measureable way. Update 2013 also clarifies State government's future involvement in IWM activities, including specific expected outcomes. Thirteen key IWM outcomes were identified and defined in close coordination with a wide variety of stakeholders. These outcomes, in combination with the Shared Values for State Government Investment, can be used to identify IWM projects and priorities for State investment.



Volume 1, Chapter 2; Imperative to Invest In Innovation and Infrastructure



# Three Themes of Update 2013 >> A Call To Align



### How Should Government Agencies Align?

- Federal, tribal, State, and local government agencies should strengthen alignment among their data, plans, programs, policies, and regulations.
- State government should more effectively coordinate the work of multi-agency collaboratives, and utilize them to align and implement State water policies and promote IWM.
- State government agencies should hire, assign, or train staff with collaboration and conflict-resolution knowledge, skills, and abilities (KSA), whose primary job is to work with other federal, State, tribal, regional, and local agencies and organizations.
- Federal and State government agencies should use a more inclusive, collaborative, and outcome-based approach for setting consistent and aligned water policies and regulations that are regionally appropriate.
- The State should convene regulatory working groups, in collaboration with federal, tribal, and local governments, to improve and streamline regulatory review and permitting processes for implementing IWM projects more expeditiously.
- The California Department of Water Resources (DWR) should form an IWM technical committee to improve communication, cooperation, and collaboration among and between technical experts and government agency decision-makers, related to data collection, management, and exchange and analytical tool development and applications.





#### Why Should Government Agencies Alian?

While many laws, policies, and practices do not currently support IWM, well-aligned government agencies expedite and reduce the cost of implementation of resource management strategies and help ensure efficient achievement of IWM objectives. Multiple agencies can involve many roles and complexities that must be aligned to function for maximum benefit, and the first step is to better understand those complexities. The second step is to establish principles and goals that will help to focus and guide integrated efforts.

#### Principles for Improving Alignment

- 1. Increased coordination with all levels of government and agencies (federal, tribal, State, and local), stakeholder groups, private landowners, and others.
- 2. Increased effectiveness through leveraging of existing networks, relationships, and multi-agency venues.
- Improved sharing of data, information, tools, and science among government agencies and academia.
- Better alignment of planning, policies, and regulations across governments and agencies, as well as coordinated and streamlined permitting to increase regulatory certainty.

#### Examples of successful government agency alignment (ongoing processes, groups, and initiatives)



#### **CA Biodiversity Council**

The California Biodiversity Council (CBC) was formed in 1991 to improve coordination and cooperation among the various federal, State and local resource management organizations. In 2013, the CBC created a resolution for Strengthening Agency Alignment for Natural Resource Conservation.

#### Interagency Drought Task Force

In December 2013, the governor formed a Drought Task Force to review expected water allocations, examine and coordinate water conservation priorities, coordinate water transfers, and develop groundwater monitoring programs, where necessary.

#### California Water Action Plan

A coordinated effort by California Natural Resources Agency, the California Environmental Protection Agency, and the California Department of Food and Agriculture identified key actions for the next one to five years that address urgent needs and provide the foundation for the sustainable management of California's water resources.

#### Water 360 Summit

In April 2013, DWR hosted an event in partnership with the Water Education Foundation and the California Water Commission, and 200+ other attendees and guest speakers. The summit brought together water leaders from many agencies and organizations to share experiences and ideas on how we can effectively align to provide sustainable water resources services in the state.

#### California's Flood Future

Recommendations for Managing the State's Flood Risk, developed in partnership with the U.S. Army Corps of Engineers, is a comprehensive look at flooding throughout the State and makes recommendations for future actions to reduce flood risk.

# Three Themes of Update 2013 >> A Call To Invest

INTEGRATE **ALIGN** 

Over the next decade, California needs \$200 billion to maintain current levels of service and system conditions. California needs up to \$500 billion in future investment over the next few decades to reduce flood risk, provide reliable and clean water supplies, and enhance ecosystems.

### Future Resiliency Requires Continued and Sustained Investments in Innovation and Infrastructure

Given the dire future circumstances described in "A System in Crisis" and other sections of this booklet, increasing levels of strategic investment are required just to maintain our current level of public safety, quality of life, and ecosystem conditions.

**Innovation** includes development of new analytical tools and other planning process improvements

- Governance of State IWM improvements.
- Planning and public engagement improvements.
- Strengthening government agency alignment.
- Information technology (data and analytical tools) improvements.
- Water technology and science advancement.
- Implementation incentives.

Infrastructure includes structures and facilities that support human activities (gray), but it also includes (green) infrastructure such as wetlands, riparian habitat, watershed systems.

### Current Funding Methods are Not Sustainable

Integration of resource management and planning has begun, but funding remains fragmented, unstable, and inefficient, which limits opportunities for further integration, per these examples:

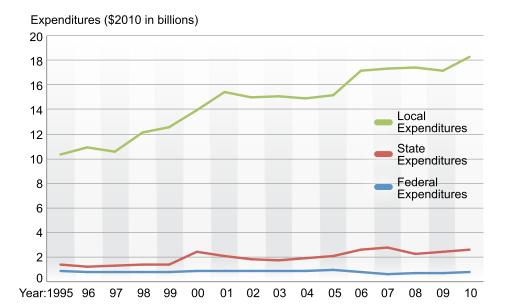
- Annual local expenditures statewide have been about \$18 billion (operations and maintenance [O&M] and regulatory compliance costs consume a large portion of local agency budgets).
- Annual State and federal expenditures are approximately \$2 billion (very little capital investment).
- Poor alignment among public agencies affects the ability to fund and deliver efficient and economical multi-benefit projects.
- Reduced taxpayer willingness and ability to support additional GO bond financing.

#### Add Value through State Government Investments

- 1. What regions cannot accomplish on their own.
- What involves interregional, interstate, or international issues.
- What the State can do more efficiently, per these examples:
  - A. Facilitate process improvement and government agency alignment.
  - Provide regulatory oversight and alignment.
  - Conduct statewide strategic planning.
  - Advance promising water technologies.
  - Provide data, information, decision support, modeling tools, and expertise.
  - Conduct and coordinate public outreach and policy guidance.
  - Facilitate systemwide water management.
- 4. What provides broad public benefits, including support for disadvantaged communities.

### Investments Over Previous Decade: A Good Down Payment

Local entities, such as special districts, water districts, utilities, and cities, account for the largest portion of IWM expenditures, and this is expected to continue for the foreseeable future. Annual local expenditures statewide for 2010 totaled about \$18 billion. Even with significant IWM investment by local agencies, the water management community reports that water projects at all levels of government are commonly underfunded. Given the historical increases shown in the accompanying graph, it is getting more difficult to generate additional local revenues (i.e., rate increases).





How We Pay For It







Update 2013 provides a cornerstone for stakeholders to work collaboratively through critical funding needs and issues, develop durable finance mechanisms, and identify reliable revenue sources.

#### The Finance Planning Framework provides:

- A structure for developing a comprehensive, well-supported finance plan.
- A logical structure and steps for discussing multiple requirements, perspectives, and previously non integrated financing information.
- Ability for stakeholders, collectively and in context, to consider the issues to be addressed and the decisions to be made.

#### Shared Values for Guiding State Government Investment

The shared values and attributes of finance strategies below have been developed through extensive stakeholder collaboration and can be used to guide future finance strategies or policies.

**Prioritization of State Government Investments** — Investment decisions will include equal regard for economic, environmental, and social criteria.

**Fiduciary Responsibility** — State government will be fiscally responsible with State funding. **Beneficiary and Stressor Responsibilities** — Those receiving benefits or creating impacts pay for them.

#### Menu of Funding and Finance Alternatives

The Finance Planning Framework provides alternatives for developing a diverse and stable portfolio of revenues. The alternatives assessment includes the following description for each potential revenue source:

- List of potential revenues sources.
- Appropriate uses.
- Implementation feasibility.
- Key trade-offs.
- Current applications in California.

#### **IWM Revenue Sources**

- State general fund.
- General Obligation bonds.
- Revenue bonds.
- User fees.
- Assessment districts.
- Utility user tax.
- Impact t fees.
- Statewide water use fee.
- Public goods charge.
- Mello-Roos special taxes.
- Private investors.

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Private-Philanthropic.

### Attributes of Future Finance Strategies

- Improve cost effectiveness, efficiencies, and accountability.
- Avoid stranded costs and funding discontinuity.
- Leverage funding across State government agencies.
- Increase certainty of desired outcomes.

#### Developing State Government IWM Finance Strategies and Investments

- State government should continue to provide incentives for IRWM activities that achieve State goals or provide broad public benefits.
- State government should improve and facilitate access to federal and State public revenue sources.
- The governor and the Legislature should broaden the ability of (and create guidelines and limitations for) public agencies to partner with private agencies, entities, and organizations for IWM investments.
- State government should develop a more reliable, predictable, and diverse mix of finance mechanisms and revenue sources to continue to invest in IWM innovation activities and infrastructure (green and grey) that have broad public benefits, including General Funds and GO bonds.
- State government should reduce planning and implementation time frames and costs associated with IWM activities by clarifying, aligning, and reducing redundancies among State government agencies' policies, incentive programs, and regulations.
- The California Water Plan Update 2018 process will refine and advance the eight components of the Finance Planning Framework, as described in the "Next Steps" section of Volume 1, Chapter 7, "Finance Planning Framework."

Today's water managers must do more with less and demonstrate (and provide assurances regarding) the value of publicly financed actions. This is in response to that fact that Californians are increasingly feeling the effects of drought, economic instability, rising public sector debt, and weakening public support (and ability to pay) for critical actions. This condition was, in part, spawned by insufficient and unstable State and federal investment and action over the past 20 years. The state has become far too reliant on outdated infrastructure and technology that are no longer capable of meeting our growing needs. This practice is placing our future prosperity at risk; particularly if no action is taken soon. Even if we begin to act immediately, Californian's can still expect to pay more and get less in the future as old infrastructure fails more frequently and severely and as future generations begin to pay back the debt we have already accrued.

Update 2013 provides a roadmap for actions that can help mitigate such consequences. However, all Californians must learn more about the risks they face, and cohesively support investment in new innovation and infrastructure to help sustain their safety, the environment, and economic stability.

Volume 1, Chapter 8; Roadmap For Action

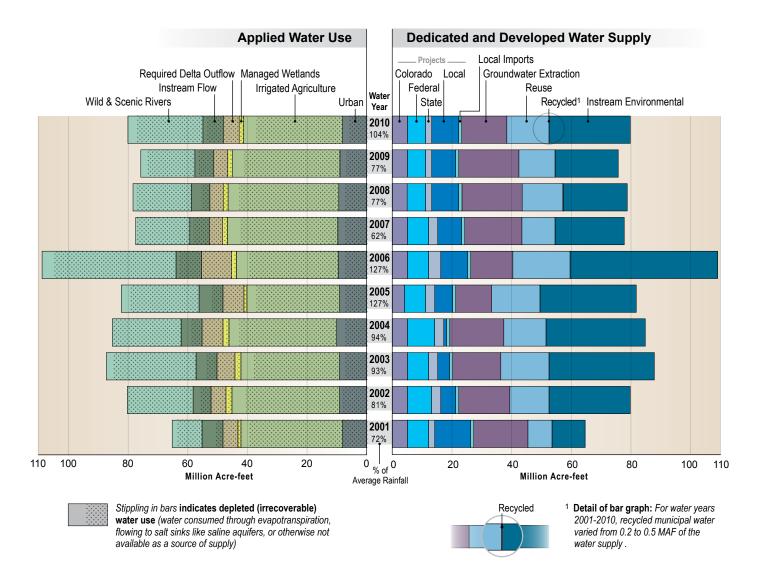


What We Must Know

#### California Water Balances by Year

22

California's water supplies vary from place to place, season to season, and year to year. The state's water users (environmental, agricultural, and urban sectors) have variable needs for the quantity, quality, timing, and place of use. Update 2013 developed water balances to show water used and sources of water for the individual years from 2001 through 2010 (shown in the figure below). This 10-year period included some moderately dry years, from 2007 to 2009, and wet years in 2005 and 2006, and demonstrates the state's variability for water use and water supply. Some key insights from this information are that urban water uses are more adaptable to supply limitation and groundwater use increases in drier years when surface supplies decline.

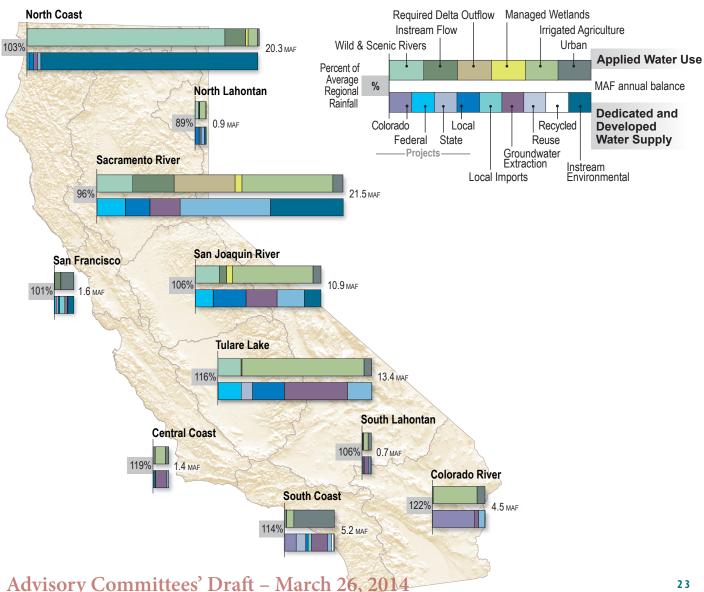


# California Water Today >> Inderstanding How We Use and Supply Water

#### Regional Diversity Requires Regional Solutions

California has a variety of climates and landforms. The amount and variability of precipitation can change dramatically across California, such that statewide average information does not truly depict regional conditions. Each region has unique challenges in meeting agricultural, urban, and environmental water uses from year to year with available supplies.

In Update 2013, regional water portfolios provide annual water use and water supply balances for the 10 hydrologic regions and the Mountain Counties area for the years 2001 through 2010. The figure below depicts balances for the hydrological regions for year 2010, considered an average year statewide. The figure shows the wide variety in regional water uses and supplies. Some regions are heavily reliant on a single source of supply to meet water uses, while others have a mix of supplies that can help them through dry periods.

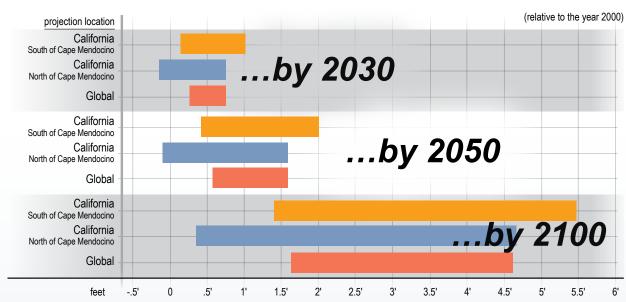


## Climate Trends > > Already Affecting California's Water

#### Existing and Future Impacts

California has undergone a warming trend over the past century, to the tune of 1.1 to 2 °F increase in year-round average temperatures. Summertime heat waves are increasing. Over recent decades, there has been a trend toward more rain versus snow in the total precipitation volume over the state's primary water supply watersheds. The timing of runoff has shifted to earlier in the year in California's largest water-supply watershed. The water management community has invested in, and depends on, a system based on historical hydrology, but managing to historical trends will no longer work because historical hydrology no longer provides an accurate picture of future conditions.

#### West Coast and Global Sea Level Rise Projections



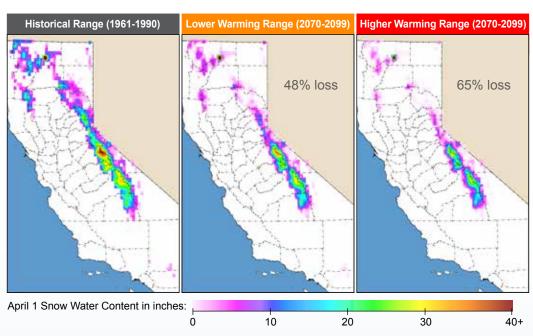
By 2050, sea level could rise between 0.5 and 2 feet along most of California's coastline. Potential impacts from sea level rise on the state include:

- Land use impacts in inundated areas.
- Increased stress on Delta and coastal levees
- Increased salinity in coastal aguifers.
- Increased salinity in the Delta, which may require changes to water management of the Delta.
- Ecosystem impacts from higher air and water temperatures.

Volume 1, Chapter 3 California Water Today

Climate change creates critical challenges for California water resources management. Higher temperatures are melting the Sierra snowpack earlier in the year and driving the snowline higher, resulting in less snowpack to store water for California users and the environment. Intense rainfall events will continue to affect the state, possibly leading to more frequent and/or more extensive flooding. Droughts are likely to become more frequent and persistent this century. Storms and snowmelt may coincide and produce higher winter runoff, while accelerating sea-level rise will produce higher storm surges during coastal storms. Rising sea levels increase susceptibility to coastal and estuarine flooding and increase salt water intrusion into coastal groundwater aguifers and estuaries like the Delta. Together, higher winter runoff and sea level rise will increase the probability of levee failures in the Delta and other coastal areas. Sea level rise will also place additional constraints on management and water exports from the Delta.

#### Historical and Projected April 1 Snow Water Content for the Sierra



Historical and projected April 1 Snow Water content for the Sierra for lower and higher warming scenarios depicting the effect of human generated greenhouse gases and aerosols on climate. By the end of this century, the Sierra snowpack is projected to experience a 48 to 65 percent loss from its average at the end of the previous century (Pierce and Cayan, 2013).

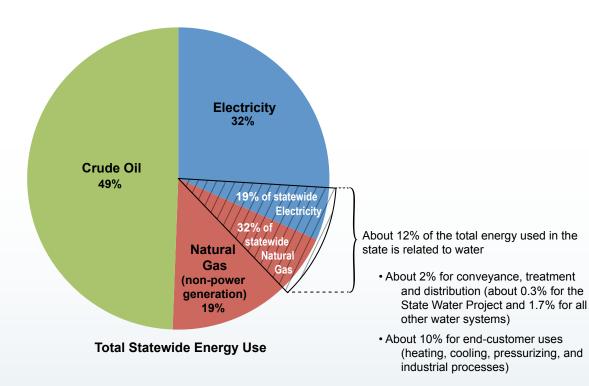
- Sierra Nevada snowpack could be reduced by 48 to 65 percent by the end of the century. California relies on snowpack as a major water supply.
- Earlier runoff timing and increased water demand in a warmer climate could mean greater water shortages.
- Increased flood risk resulting from warmer and stronger winter storms may affect the state's economy and public safety.
- As water demands increase and the reliability of surface water is reduced, demands on groundwater are expected to increase.

# Preparing for the Future > Informed and Transparent Decision-Making

#### The Water-Energy Nexus

Energy is used throughout the water sector to extract, convey, treat, distribute, and heat water. Water and energy have a complex relationship with multiple interdependencies, which is often referred to the water-energy nexus. Understanding the relationship of water and energy is important for decision-making with regard to the more efficient use of limited water and energy supplies to meet increasing future demands. The energy intensity of major water supplies is explored in Volume 3, Regional Reports. Since energy usage is closely related to greenhouse gas (GHG) emissions, this information can support measures to reduce GHGs, as mandated by the State.

#### Energy Use Related to Water



- Water is used by the energy sector, and energy is used by the water sector.
- The water-energy nexus provides opportunities for conservation of these natural resources, as well as reduction of GHGs.
- Customers have a large role to play in reducing energy and GHG emissions.

Effective action requires an informed and common understanding of conditions, trends and solution trade-offs. California water planning and policymaking often devolves into conflict. Participants frequently operate from completely different sets of information prepared for disparate purposes. In most cases, the information is accurate but sometimes incomplete, drawn out of context, and grounded in fundamentally different assumptions. Broader assumptions are also commonly made from information prepared for specific purposes.

The Water Plan identifies three critical research areas where technical enhancements are needed to support integrated water management:

- Linking collaborative processes with technical enhancements.
- Providing effective analytical tools.
- Improving and sharing information.

While extensive information affecting water management is collected by many federal, State, regional and local programs, the information often resides in separate silos. There is a critical need for information sharing and management to support water policy decisions that provide a common and transparent understanding of water problems and potential solutions across many organizations. Achieving IWM with multiple benefits requires a transparent description of dynamic linkages between water supply, flood management, water quality, land use, environmental water, and many other factors. The CWP promotes the use of collaborative processes and technical enhancements consistent with the CWP goals and objectives to assist decision-makers to move California toward a more sustainable future.

To support IWM, institutions should work together to prioritize and align the water resources information that is collected. Improvements in management of water resources information will make it easier for institutions to report, use, and analyze available information. As relationships between institutions develop, gaps in water management data will become more apparent and resources can be allocated to address those data gaps to improve the overall understanding of water in California in space and time. Integration of information should begin with the largest users or collectors of water information.

> *Volume 1; Chapter 8 contains several specific recommendations* to improve water management decision-making.





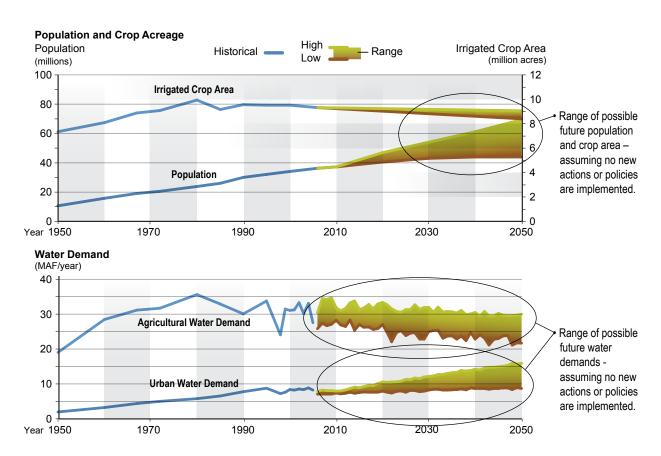
For detailed information on energy intensity of regional water supplies, see each Regional Report, Volume 2.

## Water Scenarios 2050 ► ► ► Preparing for the Future

#### Factors That Shape Our Future

There is no way of predicting the future with absolute certainty, yet scenarios can help us plan for an uncertain future. Update 2013 looks at many plausible and very different future scenarios (or futures) through the year 2050 to consider uncertainty, risk, and resource sustainability. A number of factors that the water community cannot control — yet which affect future water demand for the urban, agricultural, and environmental sectors — were used to describe these future scenarios, factors such as population growth, land-use development patterns, and climate change. Update 2013 made significant improvements to the scenario analysis by considering a greater number of future growth and climate changes scenarios, and for the Central Valley, by evaluating water uses and supplies and testing various response strategies.

The goal of scenario planning is to illustrate how California's regions would need to respond to a variety of future conditions, some especially challenging, by implementing a mix of resource management strategies. Each future scenario describes a different baseline for 2050, to which the water community would need to respond. Those combinations of management strategies that prove effective under a variety of future conditions (scenarios) are considered to be more robust.

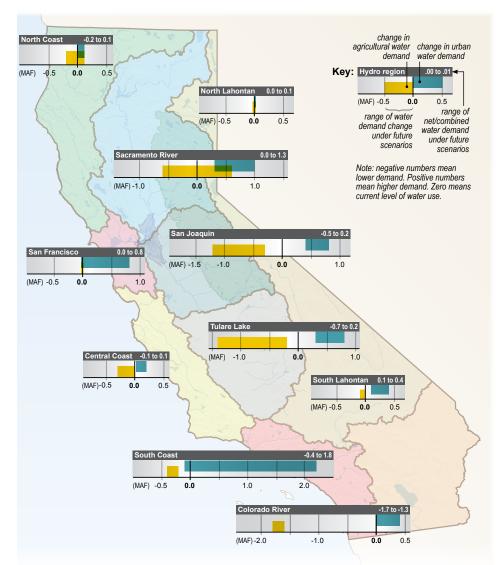


#### Water Scenarios Play Out Differently in the Hydrologic Regions

Regional water demands change in their own unique ways and in response to variations in water demand, population, irrigated crop acreage, temperature, and precipitation. Hydrologic regions expecting higher population growth show greater increases in water demands. Population growth also tends to drive urbanization of agricultural lands, reducing irrigated crop acreage. Precipitation and temperature heavily influence water demand for outdoor landscaping and irrigated agriculture. Less precipitation means more irrigation, and warmer temperatures increase crop water needs.

The extreme uncertainty about future demands across regions is evident in the figure and underscores the importance of adaptable, regionally appropriate State government policies and regionally led initiatives. IRWM, supported by flexible State government incentives, delivers such solutions.

#### Future Regional Water Demand Changes



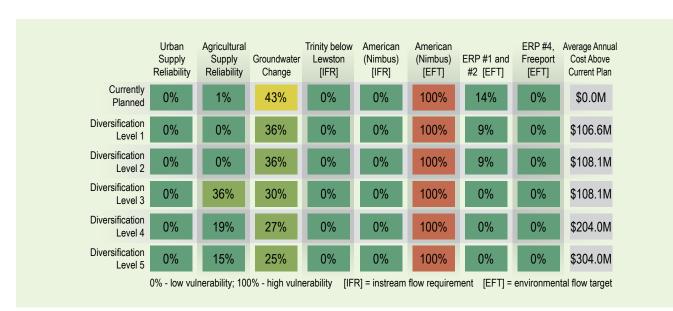
# Value of Public Investments >> Improving Data, Tools, and Performance

Update 2013 evaluated the vulnerabilities in the Central Valley of the current water management system by using 198 future growth and climate change scenarios for 2050 — in particular, urban supply reliability, agricultural supply reliability, change in groundwater storage, and water for the environment. The result of this vulnerability analysis is labeled as Currently Planned in the figures on these two pages.

The study finds that the agricultural sector in the San Joaquin River Hydrologic Region, and the urban and agricultural sectors in the Tulare Lake Hydrologic Region, are particularly vulnerable to many of the future climate and growth scenario conditions. Groundwater levels and environmental flows are also vulnerable. Additional urban and agricultural water use efficiency, conjunctive management/groundwater recharge, and recycled water significantly reduce these vulnerabilities. The implementation of new environmental flows and groundwater storage targets improve outcomes; however, higher efficiencies and/or other management strategies are needed to maintain urban and agricultural water supply reliability. The study shows that costs increase with the significant conservation and recycling implemented in Diversification Levels 2 and higher. Note that the cost of adding environmental flow requirements and groundwater reduction targets in Diversification Level 3 are not accounted for in the figure.

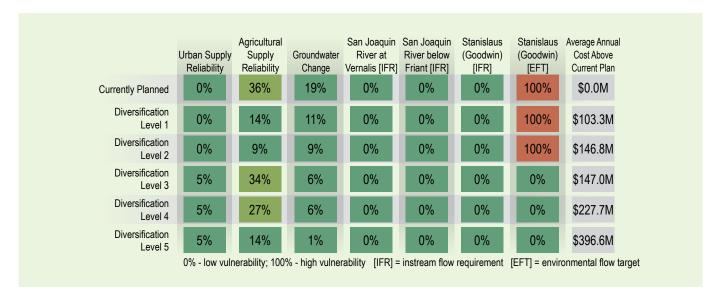
#### Strategies to Reduce Vulnerability in the Sacramento River Region

- Urban supply reliability is high for all futures across all diversification levels.
- Agricultural reliability declines below a 95 percent reliability in about 1/3 of all futures when additional environmental flow and groundwater recovery targets are implemented (Diversification Level 3).
- Reliability in about 1/2 of the future scenarios recovers with the implementation of strategies in Diversification Level 5. Groundwater conditions improve (lower vulnerability) with higher diversification levels.
- The additional flow targets improve Ecosystem Restoration Programs (ERPs) #1 and #2 completely eliminating any vulnerability. While they do not improve the number of futures in which the additional American (Nimbus) target exceeds 95-percent reliability, flows and reliability do increase.



#### Strategies to Reduce Vulnerability in the San Joaquin River Hydrologic Region

- Water use efficiency, conjunctive management, and recycling improve agricultural supply reliability with no declines in groundwater storage.
- The addition of environmental flows and groundwater recovery targets in Diversification Level 3 improves groundwater storage and achieves targeted flows at Stanislaus (Goodwin) for all futures.
- Improvements in groundwater and environmental flows reduce agricultural and urban supply reliability (Diversification Level 3). Additional water use efficiency and conjunctive management in Diversification Level 5 help to improve supply reliability.

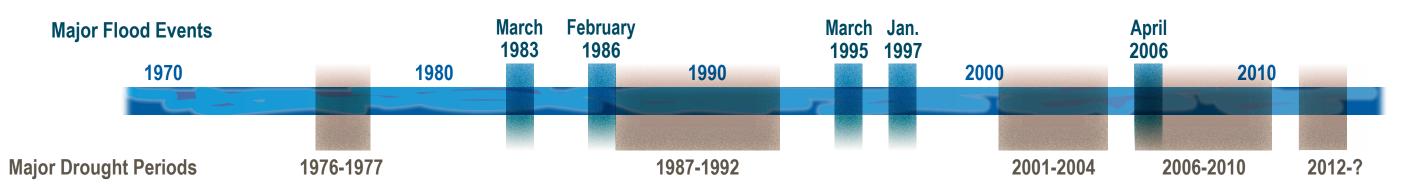


#### Strategies to Reduce Vulnerability in the Tulare Lake Hydrologic Region



- Urban and agricultural supply reliability improves Improvements under Diversification Level 2.
- Groundwater storage improves considerably with the implementation of groundwater recovery targets and more efficiency in Diversification Levels 3-5.
- Vulnerability in the urban sector was reduced by the management strategies, but to a lesser extent than in the other two regions of the Central Valley.
- Agricultural supply reliability remains relatively low (vulnerable) for all diversification levels.

# Delay at Our Own Peril > Consequences of Deferred Action



#### California Water — Variable and Extreme

California water is highly variable and extreme, while public safety, environmental stewardship, and economic stability depend on predictable and reliable supplies. Nearly every year, the state faces either a drought or floods, sometimes in the same year. At the same time, statewide water demands are expected to increase, and flood and drought risks and impacts will be exacerbated by rising sea levels, reductions in snowpack, and more extreme river-runoff patterns. California needs sustained investment in innovation and infrastructure or live with an unacceptable reduction in public safety, quality of life, and environmental stewardship for generations to come. Poor alignment among public agencies affects the ability to fund and deliver efficient and economical multi-benefit projects.

#### \$600 Billion in Assets and 7 Million People in Floodplain



### California Drought — More Frequent, Longer

Droughts are expected to occur more frequently and last longer in the future, thus exacerbating economic harm to urban and rural communities, loss of crops, potential for species collapse, degraded water quality, and extreme fire danger. Greater reliance on groundwater during dry years can result in increased pumping costs, stream depletion, groundwater overdraft, and land subsidence for many groundwater basins. At the same time, water users who have already improved their water use efficiency may find it challenging to implement additional water-use reductions during droughts.

#### Droughts are inevitable in California, but drought impacts don't have to

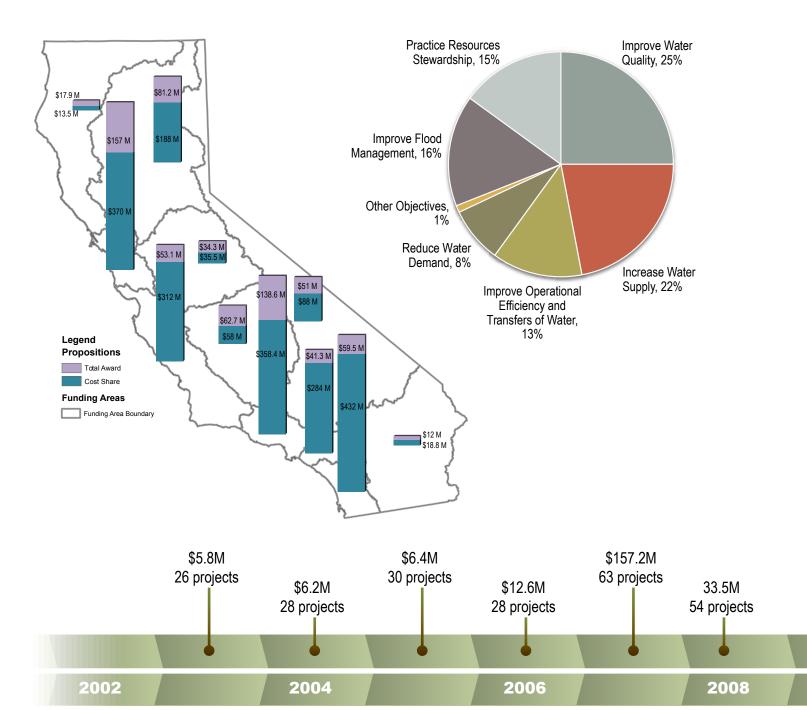
be. Drought impacts are just as much caused by a lack of preparedness (which is within our control) as by dry conditions (which are beyond our control). It is important for everyone to understand that, unlike flood emergencies, droughts occur gradually and get worse over time. Also unlike flood emergency response actions (which can save lives and damage in response to an event), there are very few drought responses that can significantly reduce damages once a drought is occurring. The most effective way to manage droughts is to begin aggressively implementing resource management strategies 5 - 10 years before a drought occurs.

Nonetheless, water supply reliability is vulnerable in many regions throughout the state and with regard to California's State and federal water projects as a result of several factors, including growing demand, lack of facility integrity (owing to severe vulnerability to earthquake risks and aging infrastructure), institutional conflicts or constraints, and declines in protected aquatic habitat and species. Some of the most notable effects became evident in February 2014, when, for the first time in history, estimated water deliveries from the State and federal water projects were expected to be zero. This means a reduction of enough water to supply up to 16 million households for one year. To adapt to unreliable surface water delivery systems, water agencies rely more on groundwater, which in turn puts more pressure on groundwater aquifers and supplies that are already strained in many areas of the state.



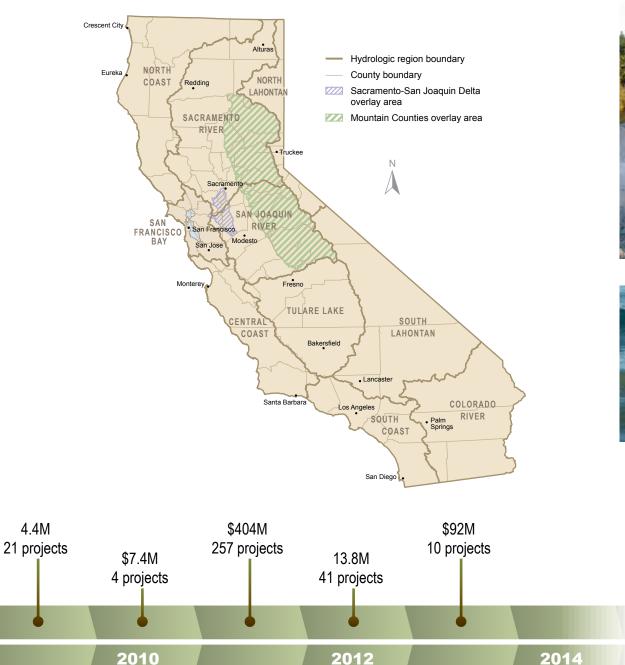
### A Decade of Investment in Integrated Regional Water Management

Thanks to voter-approved bond measures Proposition 50, 84, and 1E, DWR has been awarding grants since 2002 to make possible regional planning and on-the-ground projects that provide a wide range of benefits to California. Nearly \$750M has been awarded and leveraged by regional water management groups, completion of 37 comprehensive management plans, and funding for about 562 projects. Benefits range from improving water quality to increasing water supply, to protecting environmental resources and improving flood management. In addition to the grant programs listed here, DWR has awarded funds in a number of projects in the last decade. Various types include water conservation/water use efficiency, agricultural and urban water management, and flood protection.



#### Regional Report Summaries – Showing the Varied Challenges and Responses

The water resource management challenges, and appropriately, the responses vary throughout California. The following 12 regional summaries provide State, federal and tribal government officials as well as resource managers and interested taxpayers a basic insight into how these variances manifest themselves throughout California. These two-page regional report summaries highlight the "return on investment" to the voters and give a glimpse of the water conditions, success stories, additional challenges, and future opportunities within each of the ten major hydrologic regions as well as two areas of special interest, the Mountain Counties and The Sacramento-San Joaquin Delta. A much more indepth view of each region and areas of special interest is provided in each of the separate regional reports contained in Volume 2 of the California Water Plan.



4.4M



#### About the North Coast Hydrologic Region

The North Coast Hydrologic Region, the northwestern most portion of California, encompasses coastal areas, redwood forests, inland mountain valleys, and the semi-desert-like Modoc Plateau. Much of the region is mountainous and rugged; only 13 percent of the land is classified as valley or mesa. The region is divided into two natural drainage basins, the Klamath River Subbasin and the North Coastal Subbasin.

#### **Major Challenges**

- 1. Klamath River Basin: This interstate watershed has many natural and manmade stressors. There are competing water needs (agriculture, Indian tribal rights, waterfowl refuges and endangered fish) and water quality issues (elevated temperature, low dissolved oxygen levels, nutrient enrichment, and blue-green algae blooms).
- 2. Flood Control: Coastal flooding, including tsunamis, can impact more than \$4B in assets on the North Coast. Many rural communities lack the resources to implement flood control and stormwater projects.
- 3. Climate Change: Increased incidence of wildfire and intensity, increased coastal erosion and reduced area of tidal marshland zones due to sea level rise, impacts to fisheries due to shifts in ocean chemistry, reduction of summer low flows in local rivers leads to higher temperature stress to fish and other aquatic species, and increased incidence of local coastal flooding due to sea rise.
- 4. Disadvantaged Communities (DACs): 46% of the region's population is within a disadvantaged census block. Many DACs cannot afford to modernize water and wastewater infrastructure.
- 5. Marijuana Cultivation: This activity has grown exponentially in recent years on both private and public lands. Illegal marijuana cultivation is associated with illegal stream diversions, discharges of pollutants into waterways, and other water quality and habitat impacts.

#### **Success Stories**

- 1. IRWM Planning: The North Coast Regional Partnership (NCRP) formed to coordinate planning within the region. The NCRP is a consortium of counties and tribes working together on water management planning and project prioritization and implementation for the North Coast region.
- 2. Trinity River Restoration Program: A collaborative effort of federal, State, tribal, and local stakeholders to restore the Trinity River fishery. Efforts include management of reservoir releases, channel rehabilitation, spawning gravel augmentation, fine sediment control projects, infrastructure improvements, environmental compliance, and adaptive management.
- 3. Tribal Cooperation: An informal collaboration of tribes in the North Coast, led by the Cher-Ae-Heights Indian Community of the Trinidad Rancheria, formed to assist local tribes in developing an environmental assessment and implementation plan for improving ecosystems, water quality and obtaining grant funding.
- 4. Redwood Coast Tsunami Work Group (RCTWG): An interagency group working to reduce regional earthquake and tsunami hazard and to promote a coordinated, consistent mitigation program for all coastal areas. The RCTWG developed tsunami hazard maps and educational materials.
- 5. Salmon Creek Restoration: This project in Sonoma County placed large woody debris in critical locations within the creek to improve salmon habitat and lower water temperatures.

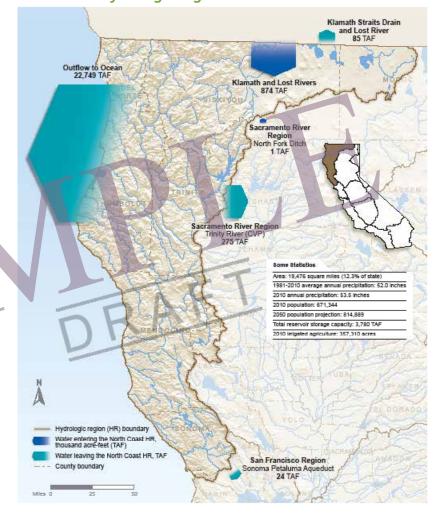
## **Integrated Regional Water Management**

One IRWM group, the North Coast Regional Partnership (NCRP), encompasses the entire hydrologic region. The NCRP developed the North Coast Integrated Regional Water Management Plan (NCIRWMP). The NCRP and its process are widely as a model of collaboration.

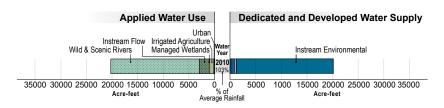
#### **Initiatives**

- 1. Oregon, California, and the USBR have partnered to conduct the Klamath Basin Study. This study is a comprehensive assessment to define current and future imbalances in water supply and demand, to evaluate the effects of climate change on water supply and demand, and to develop and analyze adaptation strategies in the Klamath Basin.
- The NCRP obtained a DWR grant to develop a pilot program to determine how to efficiently and effectively engage DACs to address local and regional water priorities.
- 3. The North Coast Regional Water Board adopted the Dairy Program in 2012 and is implementing it on approximately 126 dairies, housing about 50,000 cows in the North Coast Region.
- 4. State funding is proposed for enforcement of marijuana cultivation laws to address illegal diversion and impacts to water quality and sensitive habitat.
- 5. The City of Fortuna will construct channel improvements to reduce the threat of flooding in the lower reaches of Rohner Creek. The project will also provide for fish passage, habitat enhancement and address seismic threats.

#### North Coast Hydrologic Region Inflows and Outflows in 2010



#### Water Balance for 2010



#### Region Statistics and 2050 Projections

	2010/*2006	2050
NC REGION 10,925 SQUARE MILES (6.9% OF STATE)		
Population	19,579,208	24,717,846
Irrigated Crop Area (acres)	*362,900	XXX,000
Urban Footprint		XXX,000
Total Reservoir Storage Capacity (TAF)	3,059	
Annual Precipitation (inches)	19.7 (avg. 17.2)	